ASEC 2024 Conference
The 5th International Electronic Conference on Applied Sciences
04–06 December 2024 | Online
MDPI

Bioactive Potential of *Castanea sativa* Hedgehog for Sustainable Packaging Solutions

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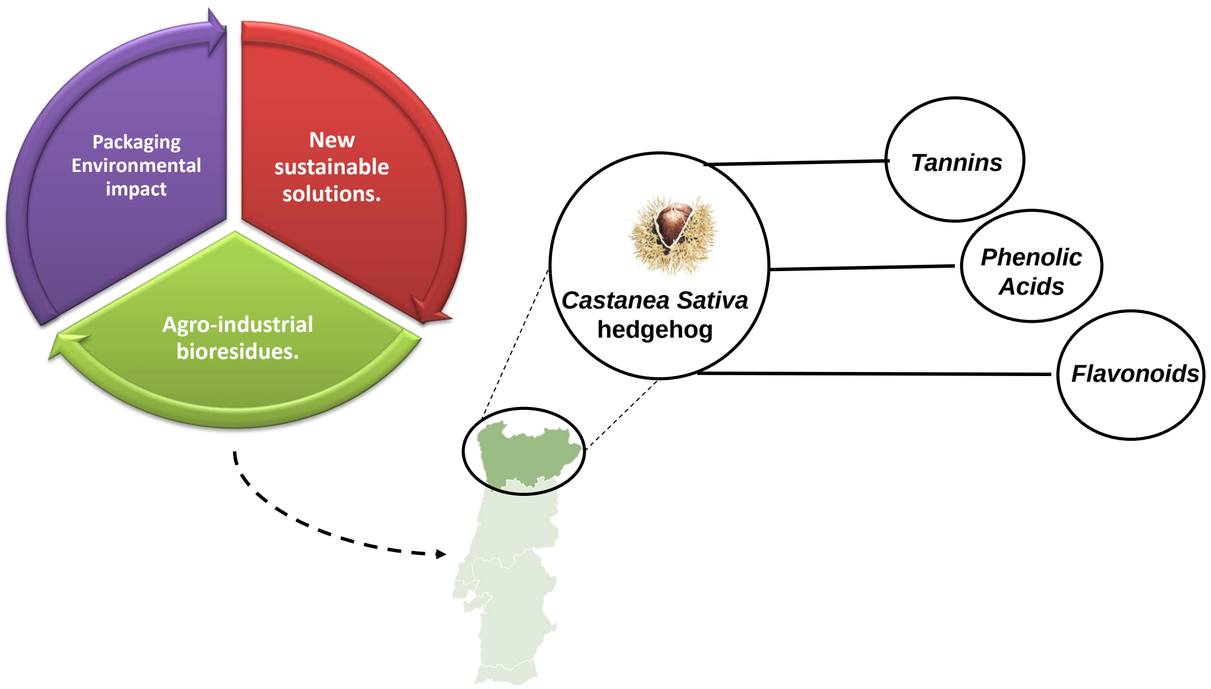
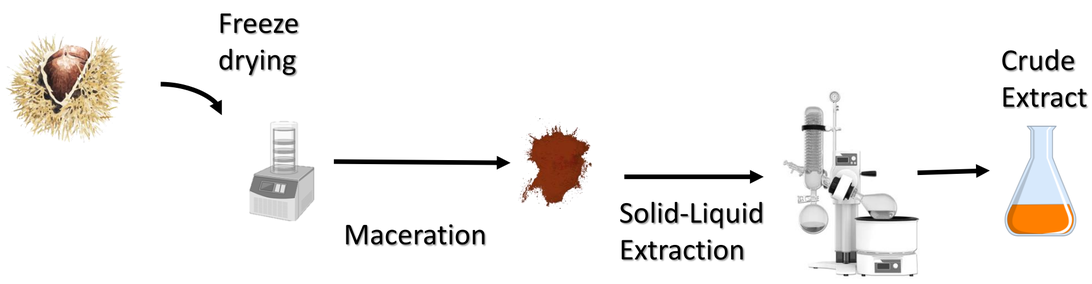
INTRODUCTION & AIM

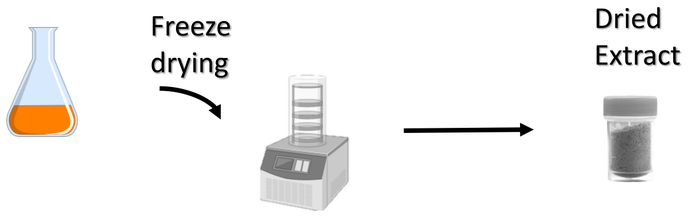


METHODOLOGY

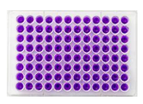
Preparation of the crude extract



Preparation of the dried extract

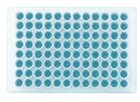


Antioxidant Activity



FRAP and ABTS methods

Antimicrobial Activity



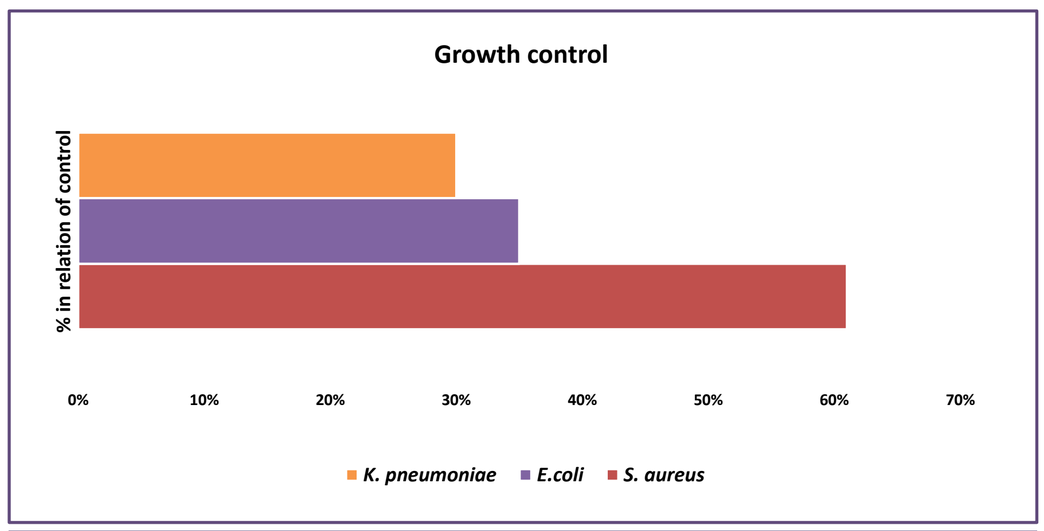
Quantification of biofilm biomass and metabolic activity

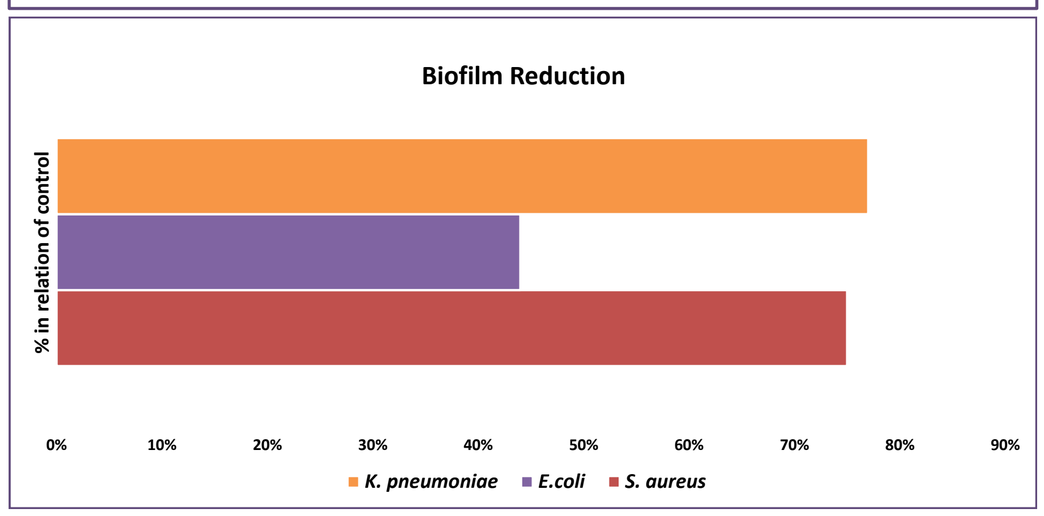
RESULTS

Antioxidant activity:

- 0.45 ± 0.03 mMTrolox/g (FRAP);
- 0.29 ± 0.17mMTrolox/g (ABTS);

Antimicrobial activity:





CONCLUSION

- Waste valorization offers a solution to the economic and environmental challenges associated with the disposal of agro-industrial bioresidues.
- Overall, our results suggest that *C. sativa* hedgehog extracts may be used as a leading natural source of bioactive compounds for future applications in bioactive packaging materials.

ACKNOWLEDGMENTS

The authors are grateful to the Fundação “La Caixa” and to FCT for the financial support through Project “WoodlandFungi - Valorização e Sustentabilidade dos Cogumelos Silvestres do Barroso", Projetos-Piloto Inovadores “Programa Promove - O futuro do Interior”, call 2023.
R. Guimarães and J. Garcia acknowledge national public funding through “Investimento RE-C05-i02 – Missão Interface N.° 01/C05-i02/2022”, a project supported under the PRR (www.recuperarportugal.gov.pt). and financed by the European Union/Next Generation EU.
Joana Martins is grateful to the Fundação para a Ciência e a Tecnologia (FCT) for her PhD Grant (2023.05610.BDANA).

REFERENCES

1. Rzayeva A, Coffigniez F, Zeynalov N, Gontard N, Guillard V. Integrating the latest biological advances in the key steps of a food packaging life cycle. Front Nutr. 2023;10(July). Available from: doi: 10.3389/fnut.2023.1223638
2. Dilucia F, Lacivita V, Conte A, Nobile MA Del. Enhance Food Packaging Performance. Foods. 2020;9:857. Available from: doi:10.3390/foods9070857
3. Pinto D, Cádiz-Gurrea M de la L, Vallverdú-Queralt A, Delerue-Matos C, Rodrigues F. Castanea sativa shells: A review on phytochemical composition, bioactivity and waste management approaches for industrial valorization. Food Res Int. 2021;144(April). Available from: doi.org/10.1016/j.foodres.2021.110364
4. Braga N, Rodrigues F, Beatriz M, Oliveira PP. Castanea sativa by-products: A review on added value and sustainable application. Nat Prod Res. 2015;29(1):1–18. Available from: doi.org/10.1080/14786419.2014.955488